STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

December 6, 2005

Memorandum

To: Holders of the Traffic Management & Signal Systems Design Manual
Private Engineering Firms and Municipality Traffic Engineers

From: G. A. Fuller, PE
State ITS and Signals Engineer

Subject: Signal Head Approach Displays

Please find attached revised pages on the subject matter for the Traffic Management & Signal Systems Design Manual.

These revisions reflect the recent interpretation by the Federal Highway Administration that when the through movement is a minor movement, Section 4D.15 still requires two separate displays for the through movement in addition to the two signal faces for the major movement (see attachment). This interpretation affects Cases 11, 13AR, 30, and 33AR of Standard Number 3.2.

The complete Traffic Management & Signal Systems Design Manual is available at the following web page: http://www.doh.dot.state.nc.us/preconstruct/traffic/tmssu/default.htm

If I may be of further assistance in this matter, please contact me at (919)733-8021.

w/ attachment

GAF/REM

cc: J. Kevin Lacy, PE
Division Traffic Engineers
Regional Traffic Engineers

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U.S. Department
of Transportation
**Federal Highway
Administration**

400 Seventh St., S.W.
Washington, D.C. 20590

October 19, 2005

Refer to: HOTO-1

Mr. Richard Mullinax
Signals and Geometrics Engineer
North Carolina Department of Transportation
Traffic Engineering
122 North McDowell Street
Raleigh, NC 27603

Dear Mr. Mullinax:

Thank you for your October 3 email to Mr. Scott Wainwright of this office, requesting an official interpretation of Section 4D.15 of the Manual on Uniform Traffic Control Devices (MUTCD) regarding the minimum number of required signal faces for through movements.

In Section 4D.15 (Size, Number, and Location of Signal Faces by Approach), the second Standard statement includes this text:

> "The signal faces for each approach to an intersection or midblock location shall be provided as follows:
>
> A. A minimum of two signal faces shall be provided for the major movement on the approach, even if the major movement is a turning movement."

You indicated that, based on this sentence in Section 4D.15, on approaches where the major (highest volume) movement is a turning movement (such as a left turn), North Carolina has been providing two all-arrows signal faces to control the turning movement and only a single signal face (circular red-yellow-green) to control the lower volume through movement on the approach. You asked whether this practice was a correct interpretation of Section 4D.15.

The cited statement in Section 4D.15 cannot be taken in isolation. It must be considered in conjunction with other applicable requirements in Chapter 4D. The following provisions of the MUTCD are also applicable to this issue:

- Section 4D.15 also states, "B. See Section 4D.06 for left-turn signal faces" and "C. See Section 4D.07 for right-turn signal faces."
- Subsequently, in a Guidance statement, Section 4D.15 also states, "If two or more left-turn lanes are provided for a separately controlled protected only mode left-turn movement, or if a left-turn movement represents the major movement from an approach, two left-turn signal faces should be provided." A similar Guidance statement covers the situation of a separately controlled right turn movement with two or more lanes.

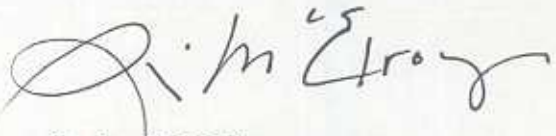
- Section 4D.06 states, in regard to separate signal faces for left turn movements: "At least one left-turn signal face shall be provided *in addition to the two approach signal faces required in Section 4D.15 for the major movement*."
- Section 4D.07 has very similar language regarding separate signal faces for right-turn movements.

On any approach to a signalized intersection from which a straight through movement is legal and possible, the driver of a vehicle intending to proceed straight through cannot be expected to be cognizant of whether he or she is part of a major movement or a minor movement. Often, traffic in the through lane or lanes may be approaching the intersection at a higher speed than traffic in turn lanes. The through driver needs to be provided with an adequate signal display to properly indicate when he or she may proceed or must stop, which may occur at different times in the cycle than applies to the turn movement. The provision of two signal faces for the through movement improves visibility of the applicable signal indications and assures a backup display in the case of burnout, failure, or knockdown of one signal face.

In consideration of all of the applicable statements in Chapter 4D and the needs of road users, it is our interpretation that item A of the second Standard statement in Section 4D.15 is intended to require a minimum of two signal faces to control the through movement on all approaches that have a through movement. Where a through movement does not exist on an approach (such as on the stem of a "T" intersection), a minimum of two signal faces shall be provided for the turning movement that is considered to be the major movement from the approach.

Thank you for writing on this subject. If you have any questions, please feel free to contact Mr. Wainwright at **scott.wainwright@fhwa.dot.gov** or call him at 202-366-0857. Please note that we have assigned your request the following official interpretation number and title: "4-297(I)—Number of Signal Faces for Through Movements." Please refer to this number in any future correspondence on this matter.

Sincerely yours,



Regina S. McElroy
Director, Office of Transportation
Operations

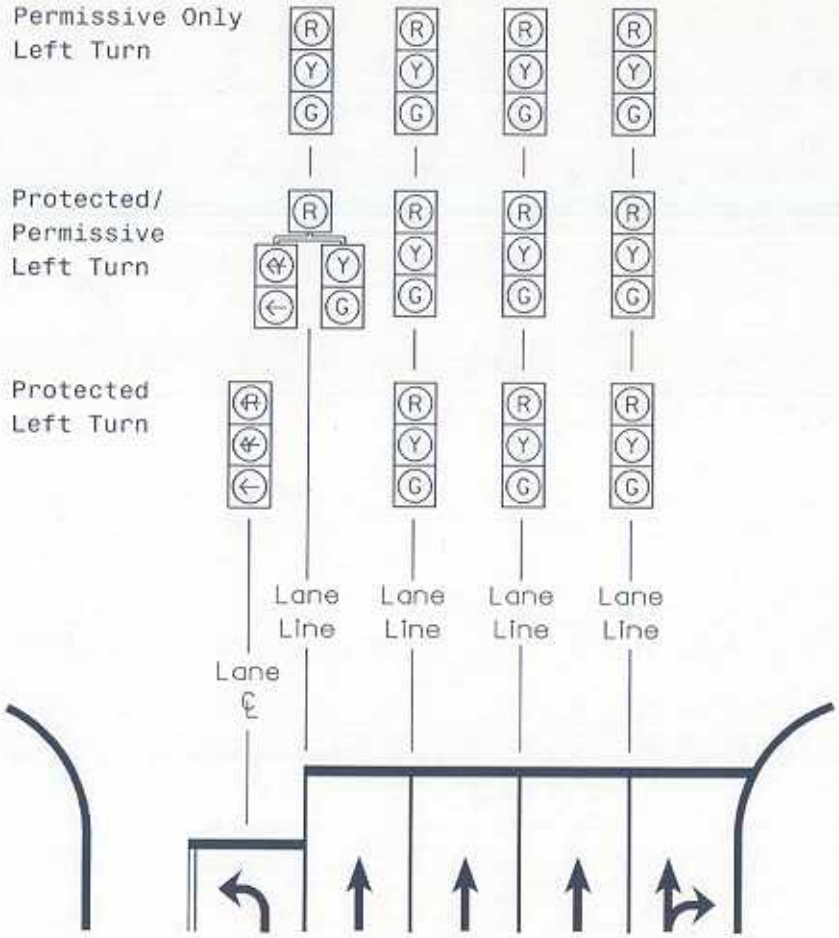
CASE 10

Standard Main or Side Street
Signal Head Configuration

10A - Permissive Only
Left Turn

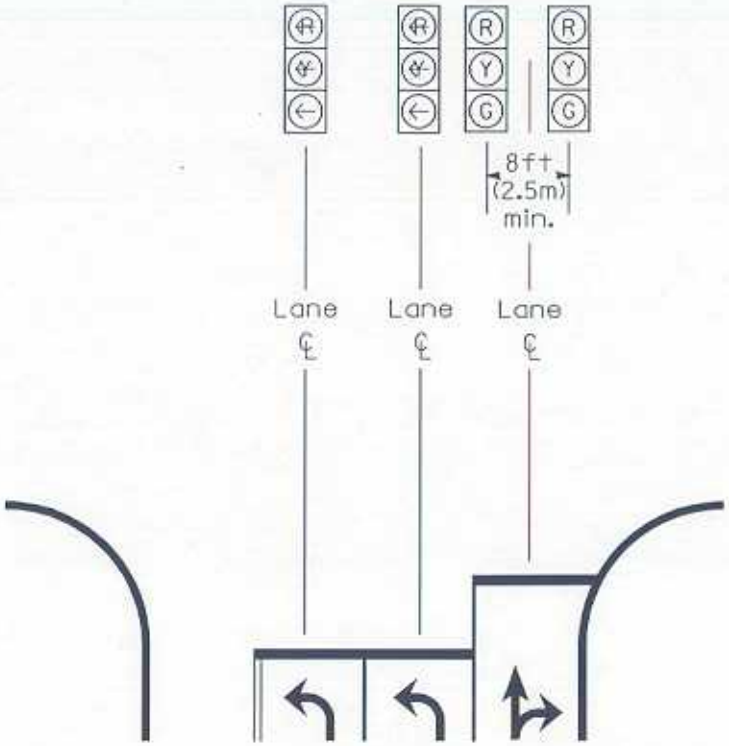
10B - Protected/
Permissive
Left Turn

10C - Protected
Left Turn



CASE 11

Main or Side Street
Signal Head Configuration
for Dual Left Turn Movements



Signal Head Approach Displays and Alignment

SIGNALS & GEOMETRICS SECTION
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

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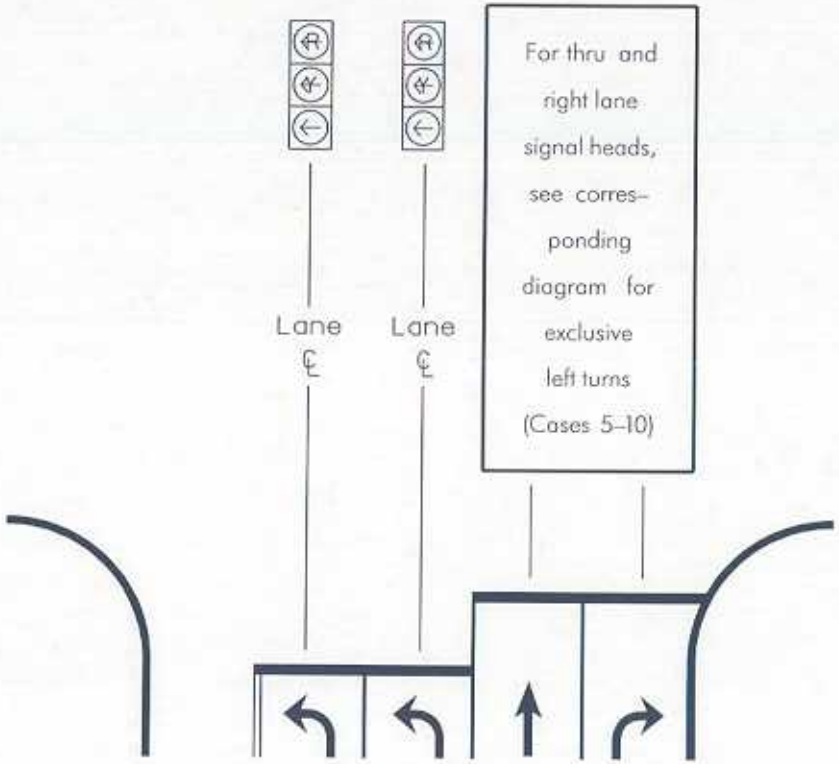
CASE 12

Main or Side Street
Signal Head Configuration
for Dual Left Turn Movements



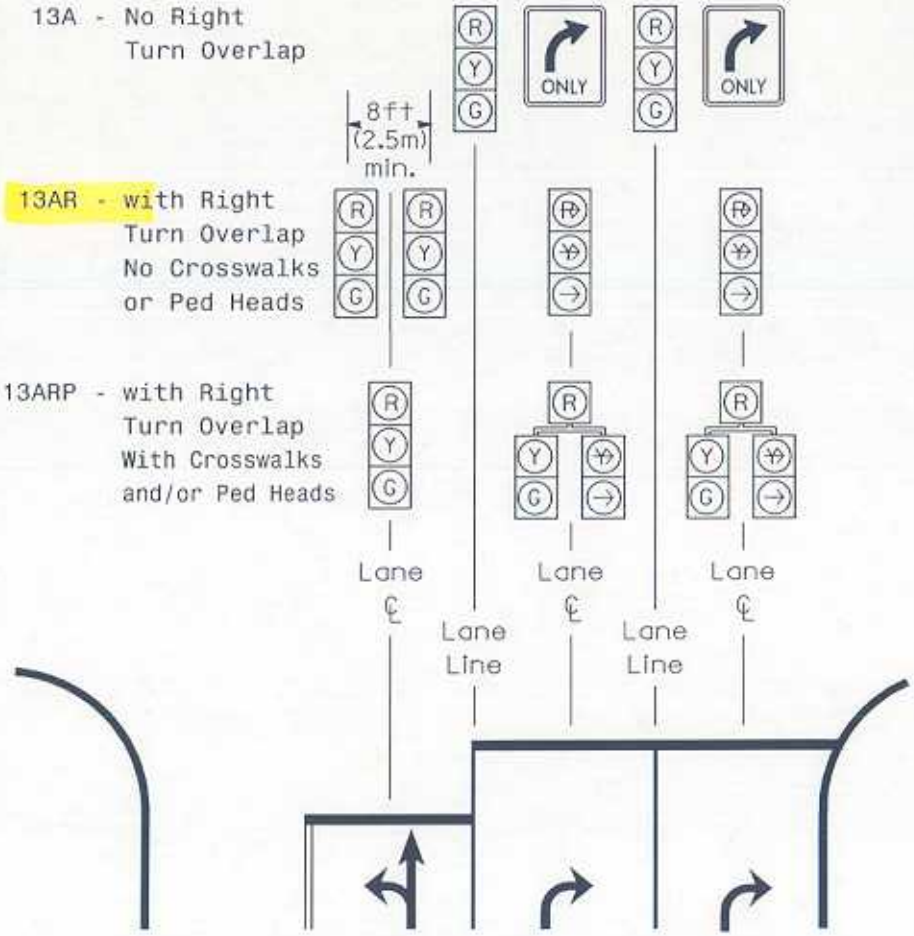
CASE 13

Main or Side Street
Signal Head Configuration
for Dual Right Turn Movements

13A - No Right Turn Overlap

13AR - with Right Turn Overlap No Crosswalks or Ped Heads

13ARP - with Right Turn Overlap With Crosswalks and/or Ped Heads



Signal Head Approach Displays and Alignment

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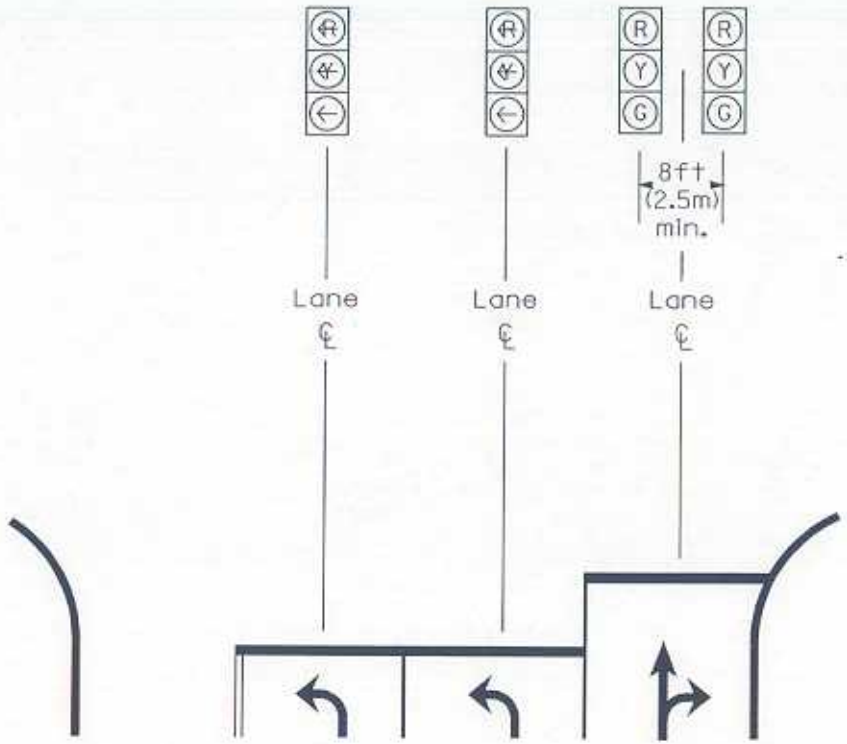
CASE 30

Split Phasing
Signal Head Configuration

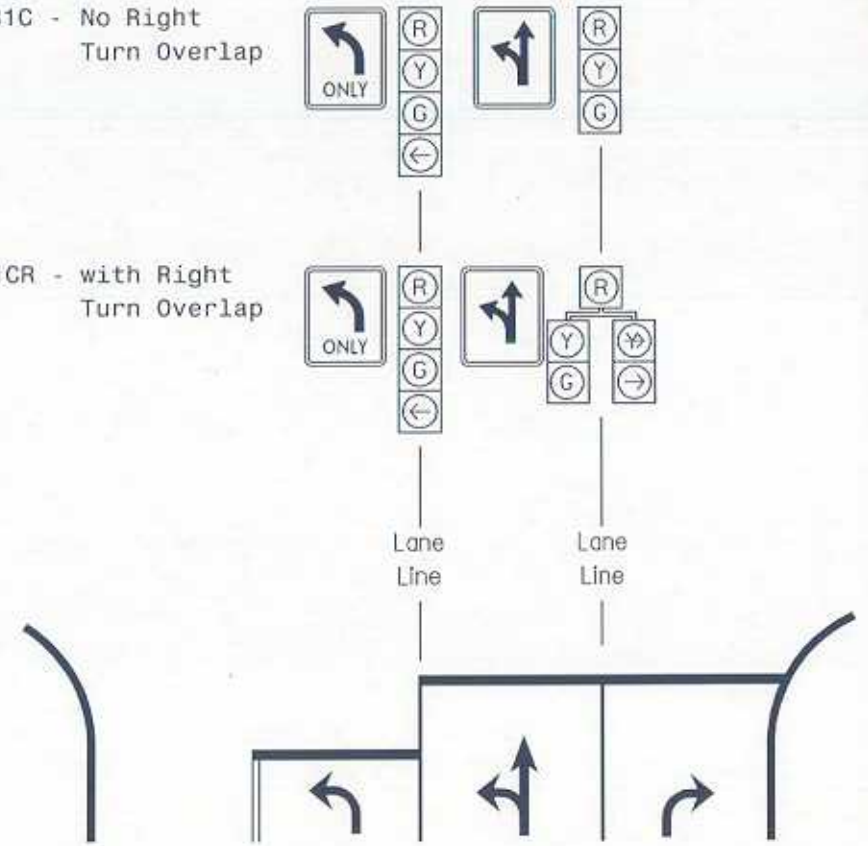


CASE 31

Split Phasing
Signal Head Configuration

31C - No Right Turn Overlap

31CR - with Right Turn Overlap



Signal Head Approach Displays and Alignment

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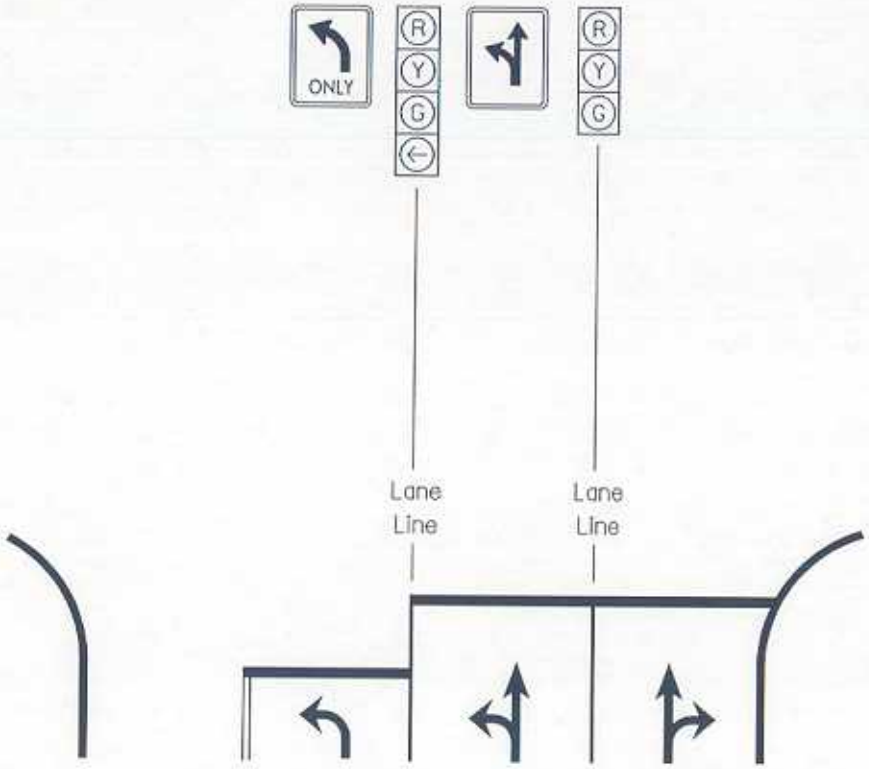
CASE 32

Split Phasing
Signal Head Configuration



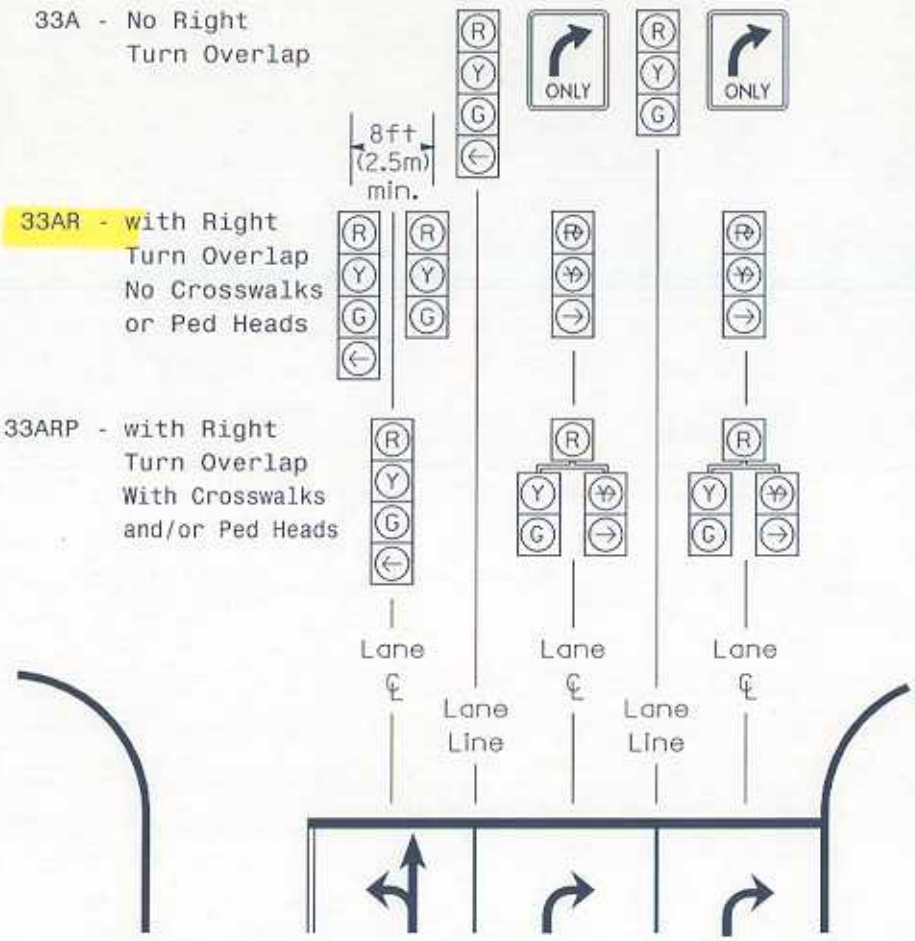
CASE 33

Split Phasing
Signal Head Configuration
for Dual Right Turn Movements

33A - No Right Turn Overlap

33AR - with Right Turn Overlap No Crosswalks or Ped Heads

33ARP - with Right Turn Overlap With Crosswalks and/or Ped Heads



Signal Head Approach Displays and Alignment

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